

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 1/15/2019 at 9:00 a.m.

Objective: Provide advice to the Water Operations Management Team (WOMT) and National Marine Fisheries Service (NMFS) on measures to reduce adverse effects from Delta operations of the Central Valley Project and the State Water Project on salmonids and green sturgeon. DOSS will work with other technical teams. DOSS notes and advice can be found at: http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/doss.html.

CDFW: Kyle Griffiths, Jason Julienne, Duane Linander, Ken Kundargi

DWR: Bryant Giorgi, Farida Islam

NMFS: Kristin Begun

Reclamation: Elissa Buttermore, Tom Patton

SWRCB: Chris Carr, Craig Williams

Agenda Items

1. Agenda review and introductions
2. RPA Implementation review (For the DOSS Dashboard, click on the "Triggers & Indices" tab at: www.baydeltalive.com/djfmfp)
3. Current Operations
4. Smelt Working Group
5. Fish Monitoring: RSTs/trawls/seines
6. Fish Monitoring: Salvage
7. Hatchery Releases
8. DOSS Estimates of Fish Distribution
9. DOSS Feedback on Entrainment Risk
10. DOSS advice
11. Next DOSS meeting

Agenda Item 2.

RPA Implementation Review

Delta RPA Actions affecting operations during January:

Action IV.1.1 (Alerts that indicate the Delta Cross Channel (DCC) gate operations may be triggered soon)¹:

- Starting on 10/1, the First Alert is triggered if either the first component (>95 cfs flow threshold) or second component (>50% change in mean daily flow) has been exceeded at either the Deer Creek gage at Vina (DCV), or the Mill Creek gage at Los Molinos (MLM). The First Alert was triggered every day this past week. See table below for details.

¹ For details, see pages 60-61 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations.%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf. Note that in October 2014, NMFS approved a modification of the first component of the first alert to a 95 cfs mean daily flow threshold in either Mill Creek or Deer Creek in lieu of operating the Mill and Deer Creek rotary screw traps.

Mill Creek (MLM)			Deer Creek (DCV)	
Date	mean daily flow (cfs)	change in mean daily flow	mean daily flow (cfs)	change in mean daily flow
1/8/19	404	-27%	415	-33%
1/9/19	1,812	349%	2,000	382%
1/10/19	739	-59%	996	-50%
1/11/19	409	-45%	564	-43%
1/12/19	302	-26%	408	-28%
1/13/19	248	-18%	329	-20%
1/14/19	215	-13%	281	-15%

- Second Alert (triggered only if both Knights Landing water temperatures are <56.3°F and Wilkins Slough flows are >7,500 cfs). The Second Alert was triggered every day this past week. See table below for details.

Wilkins Slough (WLK)		Knights Landing (KL)
Date	Mean Daily Flow (cfs)	Daily water temperature (°F)
1/8/19	17,225	47.1
1/9/19	15,935	47.2
1/10/19	22,480	47.9
1/11/19	23,165	51.1
1/12/19	18,425	50.8
1/13/19	14,271	50.6
1/14/19	12,123	50.4

Action IV.1.2² (DCC gate operations):

- DCC gates will remain closed per operations described in RPA IV.1.2 starting 12/1/18.

Action IV.2.3³ (OMR Management):

- Implementation of this action in WY 2018 began on 1/1/19, and requires that Old and Middle River (OMR) flow be no more negative than -5,000 cfs. OMR flows are reported weekly with the OMR index and the tidally filtered USGS gauges at the 5-day and 14-day running averages.
- Until the official JPE letter is issued, the threshold for the minimum fish density threshold trigger described in Action IV.2.3 will be 2.5 fish /TAF (first trigger) and 5.1 fish/TAF (second trigger).

² For details, see pages 62-66 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf

Action IV.3³ (Reduce likelihood of entrainment or salvage at the export facilities, including an alert that indicates that export operations may need to be altered):

- The Third Alert [November 1-February 28 Knights Landing Catch Index (KLCI) or Sacramento Catch Index (SCI) >10] was triggered on 1/10, 1/11, and 1/12. Since Knights Landing RST was fishing at 50% cone effort, KLCI was doubled to represent full cone effort (see **KLCI*2** column), however, this may be an exaggeration since the number of fish collected may not have been twice as many if cones were fishing at 100%. See table below for KLCI and SCI values.

Date	KLCI	KLCI*2	Seine SCI	Trawl SCI
1/8/19	2.2	4.4	no sampling	0
1/9/19	2.7	5.5	9.6	4
1/10/19	30.4	60.9	no sampling	2
1/11/19	26.4	52.8	no sampling	2
1/12/19	5.8	11.6	-	-
1/13/19	2.0	3.9	-	-
1/14/19	0.8	1.5	-	-

- Since the action went into effect on 11/1/18, no salvage-based triggers that would require export reduction have been exceeded.

Agenda Item 3.

Current Operations (1/15/19)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	2,500	Jones Pumping Plant	3,500
Reservoir Releases (cfs)			
Feather - Oroville	1,750	American - Nimbus	1,750
		Sacramento - Keswick	3,700*
		Stanislaus - Goodwin	200
		Trinity - Lewiston	300
Reservoir Storage (in TAF)			
San Luis (SWP)	893	San Luis (CVP)	708
Oroville	1,086	Shasta	2,454
New Melones	1,810	Folsom	335
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	26,966
Outflow Index (cfs)	~26,430	San Joaquin River at Vernalis (cfs)	1,300**
E:I	26% (14-day avg.)	X2	~73 km

³ For details, see pages 79-80 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf

* Keswick releases are scheduled to decrease next week by 100 cfs per day to approximately 3,250 cfs.
 ** Flows at Vernalis are expected to increase to 4,000 cfs this weekend. Exports are anticipated to increase with increasing inflows from the San Joaquin River and maintaining an OMR of -5,000 cfs.

Factors controlling Delta exports:

- 1/8/19-1/15/19: -5,000 cfs OMR limit per NMFS BiOp RPA Action IV.2.3

Approximate OMR as of 1/12/19:

	USGS gauges (cfs)	Index (cfs)
Daily	-4,800	-4,900
5-day	-4,800	-4,900
14-day	-5,400	-5,400

Approximate OMR as of 1/14/19:

	Index (cfs)
Daily	-5,000
5-day	-4,900
14-day	-4,900

Weather Forecast

Wet and windy conditions are expected across the Sacramento region today through Thursday, with periods of heavy snowfall in the mountains. Thunderstorms possible Wednesday night. Drier weather will return this weekend, potential precipitation on Sunday, followed by dry conditions on Monday.

Agenda Item 4.

Smelt Working Group

The Smelt Working Group (SWG) met on Monday, 1/14/19. **The final meeting notes were not available at the time of the DOSS call. The following summary is preliminary and is subject to change.**

Advice for Longfin Smelt for January 14, 2019:

The Smelt Working Group (SWG) determined that no flow advice was warranted for the protection of Longfin Smelt (LFS). Spawning has begun, as evidenced by recent Smelt Larva Survey (SLS) catch. The majority of larvae collected by SLS, as well as all juvenile and adult LFS collected by other surveys, were collected downstream of the confluence of the Sacramento and San Joaquin Rivers. SLS collected four larvae in the Lower San Joaquin River during their first survey, which is typical for this time of year. SWG expects an increase in larval LFS detections as hatching continues. Recent rainfall in addition to projected storm events are expected to result in hydrology that favors downstream transport of larvae.

No advice is warranted for the operation of the Barker Slough Pumping Plant. The period for flow advice pertaining to Barker Slough Pumping Plan operations begins January 15th of dry or critically dry years.

Summary of Risk:

Current and project hydrology are expected to facilitate downstream transport of LFS larvae. The most recent catch distribution shows that the majority of LFS larvae are downstream of the confluence of the Sacramento and San Joaquin Rivers, putting them at low risk of entrainment into the South or Central Delta. The presence LFS larvae in the Lower San Joaquin River is typical for this time of year. SWG anticipates that larval catch will increase as hatching continues. SWG will continue to monitor conditions and catch distribution data, and is scheduled to reconvene on January 22, 2019.

Agenda Item 5.

Fish Monitoring: The following table presents fish monitoring data summarized over the past week. Unless otherwise noted, reported sizes are fork length. Empty cells indicate zero catches at those locations with sample dates shown.

Location	GCID RST ^A	Tisdale RST ^B	Knights Landing RST ^C	Beach Seines ^D	Sacramento Trawl ^D	Chippis Is. Midwater Trawl ^D	Mossdale Kodiak Trawl ^D
Sample Date	1/12-1/14	1/7-1/14	1/7-1/14	1/7-1/10	1/7-1/11	1/6-1/8, 1/10-1/11	1/7, 1/9, 1/11
FR Chinook	159 juveniles	275	648	120	95		
SR Chinook	1 juvenile	6	14	5	7		
WR Chinook	12 juveniles 3 smolts	4	17	50	7		
LFR Chinook	1 smolt		1	1	1		
Chinook (ad-clip)	1 LFR	1 WR 1 LFR	1 WR	1	4	3	
Steelhead (wild)	1		1				
Steelhead (ad-clip)	72		3				
Green Sturgeon							
Flows (avg. cfs)	1,817	18,854	18,509				
W. Temp. (avg. °F)	48.70	57	49.1				
Turbidity (avg. NTU)	NA	64.0	58.79				

^A The GCID RST was raised on the morning of 1/4 due to predicted high flows and heavy debris and was lowered on 1/12 at 9:00 am.

^B Tisdale RST sampling period was from 1/7 at 9:30 am to 1/14 at 10:00 am. RST trap fishing effort at 50%.

^C Knights Landing RST sampling period was from 1/7 at 11:00 am to 1/14 at 10:30 am. RST traps reduced to 50% effort on 1/6. On 1/9, one of the traps was damaged and removed while the other trap was switched to fishing full cone. On 1/10, the repaired trap was lowered and both cones were fishing at 50%. On 1/10 and 1/11, both traps were raised following the trap check due to high flows and debris.

^D Data reported in the 1/6 to 1/12 DJFMP sampling summary.

Enhanced Delta Smelt Monitoring (EDSM):

One ad-clipped steelhead was caught in the EDSM sampling in Suisun Marsh.

CDFW carcass surveys

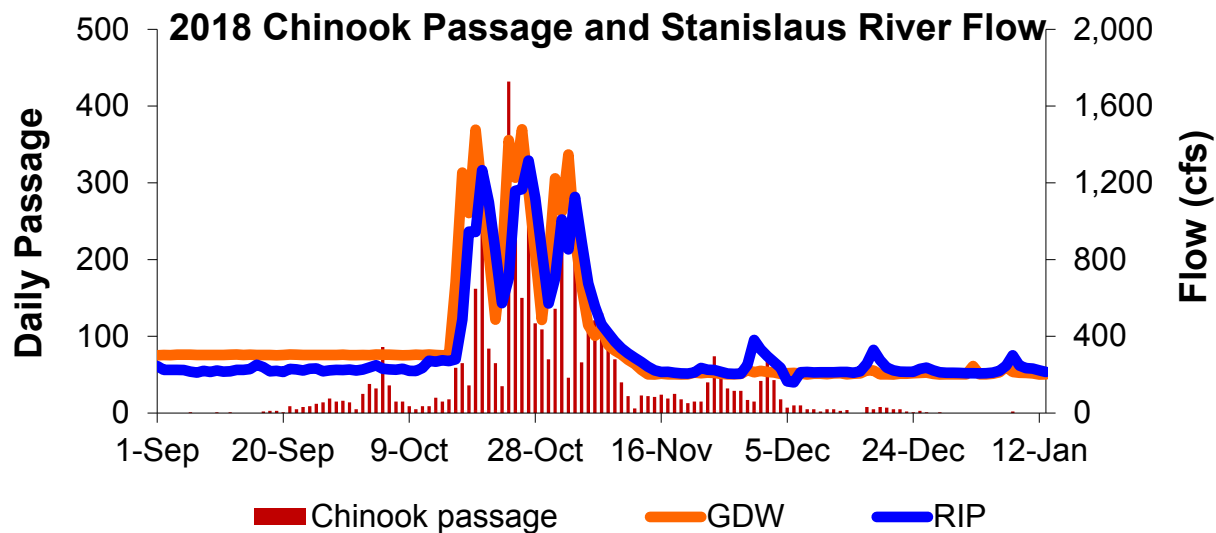
- ***San Joaquin River tributaries:*** Chinook salmon carcass surveys, with incidental redd counts, began the week of 10/1/18 on the Merced River, Tuolumne River, and Stanislaus River. CDFW has completed the ninth week of surveys. No data were collected this week.

American River:

- Chinook salmon carcass surveys began on Monday, 10/15/18. The survey area is from Nimbus Dam to Watt Avenue. The Nimbus Basin was closed to all fishing on 3/1/2018. Chinook salmon spawning is currently monitored in this area. From 1/7-1/10, 86 total fish were observed between Nimbus Dam and the Fair Oaks Bridge. The weir was pulled out during the week of 12/10 and is no longer part of the survey. 0 of 10 female carcasses observed were unspawned, 9 were spawned, and 1 was unknown due to deteriorated conditions. Water temperatures in the survey reaches were a mean of 49.0°F at the farthest point upstream at the Hazel Avenue Bridge. Carcass surveys for the 2018-2019 season concluded on 1/9/2019 with a total of 12,581 carcasses observed with peak carcass observation occurring during the week of 12/3/2018. It is estimated that peak emergence will be during the beginning of March.

Stanislaus River weir

Monitoring at the weir near Riverbank (for upstream passage of adult salmonids) began on 9/5/18. Last week (1/2/19 – 1/13/19); 2 adult fall-run Chinook salmon (*Oncorhynchus tshawytscha*) and 1 steelhead (*O. mykiss*) were observed passing upstream of the weir. The cumulative net upstream passage through 1/13/19 is 4,777 Chinook salmon (26% were ad-clipped, indicating a verifiable hatchery origin; hatcheries ad-clip 25% of their production fall-run Chinook salmon), and 23 steelhead (data provided by FISHBIO in their 1/14/19 Stanislaus Weir Update). Fourteen of the steelhead passing the weir were greater than 16 inches. Of these 14 fish, 5 were ad-clipped indicating a hatchery origin, and 9 were unclipped indicating a natural origin.



Acoustic-tagged green sturgeon

CDFW has acoustic-tagged 40 juvenile sturgeon (35 green sturgeon and 5 white sturgeon) captured between 7/24/18 and 12/27/18 near Sherman Lake on the Sacramento River (western Delta). Fork lengths of these fish range between 39 cm and 94 cm. 31 individuals have been detected (near the Sherman Lake tagging location) between 8/14/18 and 1/3/19.

Other Surveys

The following fish hatchery spawning data are provided to inform DOSS members of potential hatchery influence on catch numbers at monitoring locations. Data from additional hatchery spawning programs and other carcass surveys may be provided in the future as they become available to DOSS.

- **Feather River Fish Hatchery Spawning**
No updates were provided for this week's DOSS call.
- **Mokelumne River Fish Hatchery**
On 12/11, the Mokelumne River Fish Hatchery satisfied its egg take goal this season of 6.82 million fall-run Chinook salmon eggs. Steelhead egg take has initiated at the Mokelumne River Fish Hatchery. The seasonal egg take goal is 400,000; this number will be achievable using fish entering the hatchery this season along with broodstock already at the hatchery held over from last season.
- **Nimbus Fish Hatchery**
Last updated from 12/19, the last fall-run Chinook salmon pair was spawned 12/13 and approximately 8.4 million eggs were collected this season. As of 12/19, 13 steelhead pairs had been spawned.

Agenda Item 6.

Fish Monitoring: Salvage

Griffiths (CDFW) provided a salvage summary for the period of 1/7-1/13.

Twenty ad-clipped Chinook salmon (winter-run sized; CWT late-fall hatchery release) were salvaged at the Federal facility and 1 ad-clipped adult steelhead (658 mm) was salvaged at the State facility.

No sturgeon were salvaged at either facility.

The state facility reduced counts on 1/7 (47%) due to high fish counts and 1/7 (4%) due to a real-time flow change event.

On 1/14, there was a period of ~75 minutes of unscreened pumping during an inspection of the dewatered secondary channel.

DOSS Weekly Salvage Update

Reporting Period: January 7-January 13, 2019

Prepared by Kyle Griffiths on January 14, 2019 14:43

Preliminary Results -Subject to Revision

Criteria	7-Jan	8-Jan	9-Jan	10-Jan	11-Jan	12-Jan	13-Jan	Trend	
Loss Densities									
Wild older juvenile CS	0	0	0	0	0	0	0	↘	0.00
Wild steelhead	0	0	0	0	0	0	0	→	0.00
Exports									
SWP daily export	4,030	5,786	4,451	3,708	4,664	4,055	5,044	↘	4,534
CVP daily export	7,011	7,085	6,885	6,953	6,902	6,818	6,809	↘	6,923
SWP reduced counts	47%	4%	0	0	0	0	0		
CVP reduced counts	0	0	0	0	0	0	0		

Loss Density = fish lost/TAF; water export = AF; Trend = compared to previous week; wild = adipose fin present

Loss = estimated number of fish lost at the CVP and SWP Delta export facilities based on estimated salvage (see below)

Reduced counts = percentage of time that routine salvage sample time were less than 30 min per 2 hours of salvage and export operations

Yellow highlighted dates indicate TFCF salvage outage occurred

Chinook Salmon Weekly/Season Salvage and Loss

Combined salvage and loss for both CVP and SWP fish facilities

Race determined by size at date of capture; hatchery = adipose fin missing;

Category	Weekly Total			Season Total	
	Salvage	Loss	Trend	Salvage	Loss
Wild					
Winter Run	0	0	↘	24	31
Spring Run	0	0	→	0	0
Late Fall Run	0	0	→	6	11
Fall Run	0	0	→	0	0
Unclassified	0	0	→	0	0
Total	0	0		30	43
Hatchery					
Winter Run	0	0	→	0	0
Spring Run	0	0	→	32	21
Late Fall Run	20	14	↘	138	173
Fall Run	0	0	→	0	0
Unclassified	0	0	→	0	0
Total	20	14		170	194

Trend = weekly loss per race; Salvage = estimated number of fish collected by the CVP and SWP fish protective facilities per unit of time

NC = cannot be calculated; hatchery salmon salvage and loss estimates have been corrected using CWT readings when available

Steelhead Weekly/Season Salvage and Loss

Combined salvage and loss for both CVP and SWP fish facilities

Category	Weekly Total			Season Total	
	Salvage	Loss	Trend	Salvage	Loss
Wild	0	0	→	4	17
Hatchery	4	17	↗	8	20
Total	4	17		12	37

State Water Project loss = salvage x 4.33; Central Valley Project loss = salvage x 0.68

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES as of 1/10/19

Release Date	CWT Race	Hatchery	Release Site	Release Type	Confirmed Loss	Number Released ¹	Total Entering Delta	% Loss of Number Released ²	% Loss of Total Entering Delta ³	First Stage Trigger	Date of First Loss ⁴	Date of Last Loss ⁴
12/3/2018	LF	Coleman NFH	Battle Creek	Spring Surrogate	27.76	61,277	n/a	0.045	n/a	0.5%	12/27/2018	1/3/2019
12/14/2018	LF	Coleman NFH	Battle Creek	Spring Surrogate	13.28	66,266	n/a	0.020	n/a	0.5%	12/27/2018	1/7/2019
1/4/2019	LF	Coleman NFH	Battle Creek	Spring Surrogate	0	73,952	n/a	0.000	n/a	0.5%	n/a	n/a

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2018 through 1/10/2019.

¹Number released with the adipose-fin clipped and a coded-wire tag (CWT).

²% Loss of Number Released = (Confirmed Loss/Number Released)*100.

³% Loss of Total Entering Delta= (Confirmed Loss/Total Entering Delta)*100.

⁴Date of first and last loss accounts for all CWT loss even those from special studies where salvage and loss=0.

DWR-DES Revised 1/11/2019

Preliminary data from DFW, DWR, FWS, and Reclamation; subject to revision.

Agenda Item 7.
Hatchery Releases
None.

Agenda Item 8.
DOSS Estimates of Fish Distribution

DOSS estimates of the current distribution of listed Chinook salmon as a percentage of the population, are based on recent monitoring data and historical migration timing patterns.

Location	Yet to Enter Delta (Upstream of Knights Landing)	In the Delta	Exited the Delta (Past Chippis Island)
<i>Young-of-year (YOY) winter-run Chinook salmon</i>	15-25% (Last week: 25-38%)	75-85% (Last week: 62-75%)	0% (Last week: 0%)
<i>Young-of-year (YOY) spring-run Chinook salmon</i>	65-80% (Last week: 83-85%)	20-35% (Last week: 15-17%)	0% (Last week: 0%)

Rationale for distribution

Wild winter-run Chinook:

1 wild winter-run Chinook salmon was observed at the GCID RST, 4 at Tisdale, 17 at Knights Landing, 50 at the beach seines, and 7 at Sacramento trawl. DOSS considered that the trap efficiency was lower because Knights Landing and Tisdale RSTs were fishing at half cone, and with some weirs spilling over the past week, some winter-run Chinook likely entered the flood bypasses and did not pass by some sampling locations. DOSS estimates that an additional 10-13 percent of wild winter-run Chinook salmon population has migrated into the Delta. Since no winter-run were observed at Chippis Island trawl, no wild winter-run Chinook salmon are estimated to have exited the Delta.

Wild spring-run Chinook:

1 wild spring-run Chinook salmon was observed at the GCID RST, 6 at Tisdale, 14 at Knights Landing, 5 at the beach seines, and 7 at Sacramento trawl. DOSS considered that the trap efficiency was lower because Knights Landing and Tisdale RSTs were fishing at half cone, and with some weirs spilling over the past week, some spring-run Chinook likely entered the flood bypasses and did not pass by some sampling locations. Also, increased flows at Sutter Bypass are expected to trigger migration of Butte Creek spring-run and other tributaries that would move fish downstream. DOSS estimates that an additional 5-18 percent of the population has entered the Delta. Since no spring-run were observed at Chippis Island trawl, no wild spring-run Chinook salmon are estimated to have exited the Delta.

Agenda Item 9.
DOSS Feedback on Entrainment Risk

DOSS provides weekly entrainment risk outlooks by considering (a) two different categories of entrainment risk based on listed fish distribution and (b) factors that influence their potential for entrainment. The two entrainment risk categories considered include:

- **Interior Delta Entrainment Risk-** fish in the Sacramento River that have the potential to be entrained into the Interior Delta through the Delta Cross Channel (when open) and/or Georgiana Slough; and
- **CVP/SWP Facilities Entrainment Risk-** fish in the Interior Delta that have the potential to be entrained into the CVP/SWP facilities.

Influencing factors considered include:

- **Exposure Risk** (both categories)- estimated scale (low, medium, high) of fish anticipated to be in vicinity of an entrainment risk,
- **Routing Risk** (Interior Delta Entrainment Risk)- estimated scale (low, medium, high) that flow split conditions could result in fish migrating into the interior delta instead of remaining in main channel, and
- **OMR/Export Risk** (CVP/SWP Facilities Entrainment Risk)- for fish in the Interior Delta, estimated scale (low, medium, high) that OMR and/or Export levels could result in entrainment into the CVP/SWP facilities.

To provide an overall assessment of entrainment risk, the estimated current status of these influencing factors are described below for each of the entrainment risk categories.

Interior Delta Entrainment Risk for listed salmonids in the Sacramento River over the next week:

- **Exposure Risk: HIGH**
 - Approximately 75-85% of winter run juveniles estimated to be in the Delta.
 - Approximately 20-35% of spring run juveniles estimated to be in the Delta.
 - Central Valley steelhead are in the system.
 - Expected storm this week to increase river flows.
 - Anticipate outmigration event to coincide with increased flow.
- **Routing Risk: LOW**
 - DCC is closed.
 - Flows are predicted to be high enough to mute tidal effects around Georgiana Slough.
- **Overall Entrainment Risk: MEDIUM**

CVP/SWP Facilities Entrainment Risk for listed salmonids in the Interior Delta over the next week:

- **Exposure Risk: MEDIUM**
 - Listed Chinook salmon have been salvaged and observed in monitoring sites in the Delta.
 - Flows are expected to increase this week due to precipitation.
 - Salvage is expected to increase with potential increase in exports, which expands the zone of exposure.
- **OMR/Export Risk:**

- OMR -2,500 cfs: LOW
 - OMR -3,500 cfs: LOW
 - OMR -5,000 cfs: MEDIUM
 - OMR -6,250 cfs⁴: MEDIUM-HIGH
 - OMR -7,500 cfs⁴: HIGH
 - OMR -9,000 cfs⁴: HIGH
- **Overall Entrainment Risk:**
 - OMR -2,500 cfs: LOW-MEDIUM
 - OMR -3,500 cfs: LOW-MEDIUM
 - OMR -5,000 cfs: MEDIUM
 - OMR -6,250 cfs⁴: MEDIUM-HIGH
 - OMR -7,500 cfs⁴: HIGH
 - OMR -9,000 cfs⁴: HIGH

These assessments are based on anticipated and current hydrology and fish distributions for the next week.

Agenda Item 10.

DOSS Advice to WOMT and NMFS: None

Agenda Item 11.

Next Meeting: The next DOSS conference call will be on **1/22/19 at 9am.**

⁴By request of management, DOSS also assessed risks at an OMR flow more negative than -5,000 cfs.